



University of Bahrain
College of Information Technology
Department of Computer Engineering

Computer Networks
ITCE 315

9

ITCE 315: Computer Networking

Midterm Exam II
Date: Sun 7.12.2014
Duration: 60 minutes
Instructor: Dr. Alabdulla A. Omary

SID:

Name:

Question	Marks	Marks obtained
1	10	7
2	28	27.5
3	24	19
4	18	16
Total	80	69.5

✓ good

Choose the most suitable answer from the following [5Marks, 1/2 Mark each]:

- 1) Which one of the following is cookies privacy?
- a. cookies does not permit sites to learn a lot about you
 - ☒ b. cookies permit sites to learn a lot about you
 - c. cookie file kept on user's host, managed by user's browser
 - d. none of the above
- 2) For client-server model, which of the following is true for the clients? Choose many answer if any
- a. Always have permanent IP address
 - b. May be intermittently connected
 - ☒ c. May have dynamic IP addresses
 - d. Do not communicate directly with each other
- 3) A process sends/receives messages to/from
- a. Application layer
 - ☒ b. Socket
 - c. TCP
 - d. UDP
- 4) For non-persistent HTTP, the total response time is
- a. $2RTT + 2$ transmit time
 - b. $1RTT +$ transmit time
 - ☒ c. $2RTT +$ transmit time
 - d. $1RTT + 2$ transmit time
- 5) Socket has:
- ☒ a. Port number of the process only
 - b. IP address associated with a process only
 - c. Port number and IP address associated with a process
 - d. None of the above
- 6) Which of the following is a transport service needed by an application
- a. minimum throughput guarantees.
 - b. Data loss consideration
 - ☒ c. Routing
 - d. Security
- 7) Which of the following is NOT true for SMTP?
- a. P2P protocol
 - b. Client server protocol
 - c. Connection oriented protocol
 - ☒ d. Need Centralized server

- 8) _____ uses two separate ports for control connection and data connection
- HTTP
 - SMTP
 - POP3
 - ☒ FTP

- 9) Which of the following is NOT true for classless address block?
- The addresses in a block must be contiguous, one after another.
 - The number of addresses in a block must be a power of 2 (1, 2, 4, ...)
 - The first address must be evenly divisible by the number of addresses.
 - ☒ None of the above

- 10) Classful addressing use:
- divide the address into 6 categories.
 - ☒ divide the address into 5 categories.
 - divide the address into 4 categories.
 - does not divide them into categories

27-5

- Q2) Answer the following questions: {28 marks}
- If we want to access 7 Objects using http protocol, compare between Persistent and nonpersistent http [4 Marks]

	Nonpersistent http	Persistent http
No of connection	parallel tcp connection for every object 7 Connections $\times 2 = 14$ connections	using one connection for all the objects. They can be kept open 1 connection
Response time	Response time = 2RTT + transmit time one RTT for TCP connection and one for transferring the first byte of data	Response time = RTT + transmit time $\times 7$

3.5

- b. Explain what is meant by elastic applications. [2 Marks]

Elastic application make use of any throughput they get.

- c. give example of two elastic applications [2 Marks]

mail, torrent

- d. What is the mail transfer protocol used in the Internet? What are the possible mail access protocols used between the receiver's mail server and the user agent? What are the protocols used between the sender's mail server and the sender? [4 Marks]

The mail transfer protocol used in the Internet : SMTP

Simple mail transfer protocol

What are the possible mail access protocols used between the receiver's mail server and the user agent?

POP3 (Post Office Protocol version 3), IMAP (Internet Message Access Protocol), MAPI (Microsoft Exchange Mail Access Protocol)

What are the protocols used between the sender's mail server and the sender?

e. Compare between TCP and UDP protocol services [6 marks]

	TCP	UDP
What is provided	reliable data transfer, flow control, congestion control	fast, transferring communication, low bandwidth consumption
What is not provided	connection throughput guarantee, timing, reliability	no reliable data transfer, no flow control, no time-sensitive throughput guarantee
Connection	connection-oriented setup, it needs a setup (handshaking) between client and server	connectionless, no handshaking

f. Describe how Web caching can reduce the delay in receiving a requested object. Will Web caching reduce the delay for all objects requested by a user or for only some of the objects? Why? [4 Marks]

When a client requests a file, it requests the proxy server (cache) and if proxy has it, it sends it directly to client, if not then it requests the origin server and when it receives it sends a copy of it to cache and keep a copy in its storage. It will reduce the delay of all objects because it reduces the traffic on the access link.

g. Consider an e-commerce site (e.g., Amazon.com) that wants to keep a purchase record for each of its customers. Describe how this can be done with cookies? [2 Marks]

1. The cookie keeps a virtual cart for the customer in its backend data base of website server.
2. cookies file will be kept in user's computer by user's browser and it needs the cookie to identify the user's cart and send it to the server when the user requests a page.

h. What is the purpose of using cookies? [4 Marks]

1. As a user comes back to visit a site every time he enters his password and ID, so it uses cookies so that the user does the authentication only the first time and then uses the cookies to log in.
2. To keep track of client preferences, so that the server figures out the contents as a function of his identity, and provide advertisements based on his preferences.

Q3) Answer the following questions:

- a- 11. What is the address space in each of the following systems?
A system with 16-bit addresses

address space = $2^n = 2^{16} = 65536$

- b- An address space has a total of 256 addresses. How many bits are needed to represent an address?

To represent only address we need 32 bits (10-11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30-31)

- c- Change the following IP addresses from dotted-decimal notation to binary notation.

- a. 190.34.16.108

10111110 . 00100010 . 00010000 . 10101000

- b. 170.14.36.89

10101010 . 00001110 . 00100100 . 01011001

- d- Change the following IP addresses from binary notation to dotted-decimal notation.

01101011/11110110/01100111/01010101

107 . 246 . 103 . 85

- e- In a block of addresses, we know the IP address of one host is 190.40.82.16/25.

- 1- What is the first address (network address) in this block?

190 . 40 . 82 . 16 / 25

- 2- What is the last address in this block?

190 . 40 . 82 . 127 / 25

- 3- How many hosts are in this block?

$2^{32-25} = 128 - 2 = 126$

$\therefore 126$ hosts are in this block

- f- Write the following masks in slash notation (/n).

- a. 255.255.0.0

/16

- b. 255.255.255.0

/24

512

Q4) An ISP is granted a block of addresses starting with 190.60.16.0/23. The ISP wants to distribute these blocks to 8 organizations with 4 organization receiving just 16 addresses and another 4 receive 32 addresses

1- Design the subblocks and give the start and last address for each block and slash notation for each subblock.

- The mask for the organizations with 16 addresses:
 $2^{32-n} = 16$ $2^{32-n} = 2^4$ $32-n = 4$ $n = 28$ \therefore The mask is /28
 1000 - 28 bits network - 4 bits host
- The mask for the organizations with 32 addresses:
 $2^{32-n} = 32$ $2^{32-n} = 2^5$ $32-n = 5$ $n = 27$ \therefore The mask is /27
 01000000 - 27 bits network - 5 bits host

First subblock Start address: 190.60.16.0 /28 Last address: 190.60.16.15 /28	2nd subblock Start address: 190.60.16.16 /28 Last address: 190.60.16.31 /28	3rd subblock Start address: 190.60.16.32 /28 Last address: 190.60.16.47 /28	4th subblock Start address: 190.60.16.48 /28 Last address: 190.60.16.63 /28
5th subblock Start address: 190.60.16.64 /27 Last address: 190.60.16.95 /27	6th subblock Start address: 190.60.16.96 /27 Last address: 190.60.16.127 /27	7th Start: 190.60.16.128 /27 Last: 190.60.16.159 /27	8th Start address: 190.60.16.160 /27 Last address: 190.60.16.191 /27

2- Find out how many addresses are still available after these allocations.

$\text{All addresses} = 2^{32-23} = 512 \text{ addresses}$
 $\text{No. of addresses used} = (4 \times 16) + (4 \times 32)$
 $= 64 + 128$
 $= 192$

\therefore The number of addresses available = $512 - 192 = 320$ addresses

00000000 1st
 00001111
 00010000 2nd
 00011111
 00100000
 00101111
 00110000 4th
 00111111

6

01000000
 01011111